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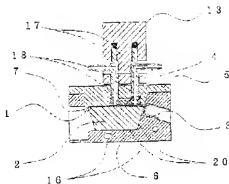
(54) **OPTICAL SENSOR UNIT, OPTICAL SENSOR
 APPARATUS USING THE SAME AND LIVING
 BODY COMPONENT DETECTOR**

(57) Abstract:

PROBLEM TO BE SOLVED: To provide an optical sensor unit easy to handle and a sensor apparatus using the same.

SOLUTION: The optical sensor unit is constituted of a sensor element for detecting an object to be measured and a prism for allowing the light emitted from a light source to be incident on the sensor element to transmit the reflected light from the sensor element to a detector and the sensor element and the prism are covered with a shading member permitting only the light of the light path of incidence light and reflected light to pass.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field belonging to an invention] This invention relates to the sensor apparatus which uses light in the biosensor field which uses especially the enzyme reaction which are an antibody antigen reaction and catalytic reaction about the sensor apparatus which detects a measuring object and generally outputs a predetermined signal.

[0002]About the sensor apparatus which detects a measuring object and generally outputs a predetermined signal, this invention sends especially a fluid to a sensor element, and relates to improvement of the sending portion of a sensor apparatus to be exchanged [of a sensor element].

[0003]

[Description of the Prior Art]As for the photo sensor, a semiconductor infrared sensor, a pyro infrared sensor, a resonant mirror sensor, a surface plasmon sensor, etc. are put in practical use.

It is mainly used for measurement of human body detection, objective detection, the measuring object detection in a sample, etc.

Especially, since measurement of the refractive index of a medium is [/ near the sensor element surface] possible for a surface plasmon sensor, it is used for chemical sensors, such as a gas sensor, the biosensor using an antibody antigen reaction, etc.

In particular, an antibody is fixed in a sensor element, and protein, nucleic acid, other living body related substances, etc. which the antibody combines specifically are detected, and it is already put in practical use as a biosensor to quantify.

[0004]

[Problem(s) to be Solved by the Invention]By the way, the photo-sensor device already used has composition which measures multiple times by forming only prism and the sensor element surface as a unit, and exchanging this unit, as it is in JP,64-6842,A, but. Since the portion of prism important in order for working to become complicated in order to have to

exchange units for every measurement with this structure, and to measure as a photo sensor serves as nakedness, Cautions were required for the handling at the time of unit exchange and conveyance, etc., and also it had a problem of detection becoming impossible by dirt or a crack.

[0005]Although it has the structure of exchanging only sensor elements, when dirt and a crack are attached to prism, in order to interfere with detection, in the sensor apparatus currently indicated by JP,4-501462,A, it is necessary to fix the inside of a device and to exchange the whole member depending on the case.

[0006]When the jam by product tampering, etc. arose in a channel, the channel which supplies a sample to the sensor element surface provided in the main part of a sensor apparatus needed to disassemble the device main frame, and repair had taken time to it. Since it did not have a channel for reacting to a specimen in the sensor element surface, and holding a sample, there are a liquid lappet at the time of sensor element exchange, liquid leakage after sensor element exchange, etc., and sensor elements were not able to be exchanged easily.

[0007]Therefore, there is the purpose of this invention in providing the sensor apparatus using the optical unit while providing an optical sensor unit with easy handling.

[0008]It is in providing a sensor apparatus with easy exchange of a sensor element, and easy repair in a channel.

[0009]

[Means for Solving the Problem]While the invention according to claim 1 comprises prism for making catoptric light which a sensor element which detects a measuring object, and incident light generated from a light source were entered in a sensor element, and was reflected by this sensor element penetrate to a detector, Said sensor element and prism are covered in a shielding member which passes only light on an optical path of incident light and catoptric light.

[0010]Since a sensor element and prism are constituted by one in this invention, while being able to perform positioning of a sensor element and prism easily, Since a sensor element and prism are covered by a shielding member, they have a protection feature which prevents contact from the outside, they can deal with it so that a sensor element, the prism surface, etc. may be stained with neither a crack nor dirt, and can perform conveyance as an optical sensor unit, and transportation easily.

[0011]The invention according to claim 2 has a channel which becomes exchangeable [said sensor element / a fluid which contained a measuring object on the surface] in the optical sensor unit according to claim 1.

[0012]In this invention, by having a channel which becomes exchangeable [a fluid having contained a measuring object on the surface of a sensor element], it becomes unnecessary to exchange an optical sensor unit for every measurement, and detection of multiple times is attained.

[0013]Since it becomes possible to save in the state where a fluid for sensor element

surface preservation is filled to a channel, and a sensor element can be used for it at any time by having a channel which becomes exchangeable [a fluid having contained a measuring object] on the sensor element surface, Only by exchanging a fluid having contained a measuring object and a fluid for sensor element surface preservation through a channel, even if wash a sensor element and it does not dry it before measurement, measurement of a measuring object is attained immediately.

[0014]The invention according to claim 3 provided an optical-path adjusting member to which said optical sensor unit adjusts an optical path of light from a light source in an optical sensor unit of claim 1 thru/or 2 given in any 1 paragraph.

[0015]Since a position of a sensor element, prism, and an optical-path adjusting member is fixable as an optical sensor unit by providing an optical-path adjusting member which adjusts an optical path of light from a light source to an optical sensor unit in this invention, In order to measure with a sensor apparatus, it is possible to become final and conclusive a position of a member which must maintain fixed physical relationship.

[0016]It is possible by providing an optical-path adjusting member to choose [parallel beam / the scattered light,] light of a light source.

[0017]The invention according to claim 4 is characterized by said optical-path adjusting member being a condenser in the optical sensor unit according to claim 3.

[0018]Since it is possible to condense and irradiate a sensor element with light of a light source by using an optical-path adjusting member as a condenser in this invention, Since light volume of a light source used for measurement can be made small, a cheap thing and a small thing can be used and a miniaturization and ***** of a sensor apparatus can be measured.

[0019]The invention according to claim 5 is characterized by said optical-path adjusting member being a gobo which has a pinhole in the optical sensor unit according to claim 3.

[0020]In this invention, by making it a gobo which has a pinhole in an optical-path adjusting member, composition which does not take into consideration a size or a focal distance of the lens itself can be taken, and a miniaturization of a sensor apparatus is possible.

[0021]Since it is processible by work of sputtering in the state where a portion of a pinhole was masked, vacuum deposition and etching, a press, etc., a gobo with a pinhole is cheaply and easily producible compared with a lens.

[0022]In an optical sensor unit of claim 3 thru/or 5 given in any 1 paragraph, the invention according to claim 6 said optical-path adjusting member, While being arranged between a light source and a sensor element, a crevice is formed at an angle of incident light for exciting SPR to a sensor element, and it is arranged in this crevice.

[0023]In this invention, it is possible by arranging an optical-path adjusting member between a light source and a sensor element to be a position as it is and to change a light source and a sensor element into a condenser according to claim 4, the gobo according to claim 5, etc. depending on a use.

[0024]It is possible by forming a crevice at an angle of incident light for making the shielding

member according to claim 1 excite SPR, and arranging an optical-path adjusting member in this crevice to become final and conclusive the degree of incidence angle of incident light and an irradiation position to a sensor element only by arranging an optical-path adjusting member in this crevice.

[0025]The invention according to claim 7 is characterized by said prism being light transmittance state resin in an optical sensor unit of claim 1 thru/or 2 given in any 1 paragraph.

[0026]In this invention, since it is producible in large quantities while processing with a metallic mold at the time of producing prism by producing prism by light transmittance state resin is attained and moldability improves, it is possible to produce prism cheaply.

[0027]Since prism shape can be freely chosen by improvement in moldability, Stand a pin for positioning for adjusting a position in an optical sensor unit to the prism itself, or, It becomes possible [providing a crevice which fixes a gobo etc. which have a condenser and a pinhole as an optical-path adjusting member, and providing a regulating function of an irradiation position etc.] to add a position determining function and an irradiation position regulating function other than a function which penetrates incident light and catoptric light through prism.

[0028]An alignment member for the invention according to claim 8 to seal and carry out the plane of composition of prism and the sensor element to said shielding member in an optical sensor unit of claim 1 thru/or 2 given in any 1 paragraph is provided.

[0029]By providing an alignment member for sealing and carrying out the plane of composition of prism and the sensor element in this invention, Since positioning of prism and a sensor element can be easily fixed by the ability to do only by arranging prism and a sensor element in a shielding member, A jig for performing alignment of prism and a sensor element at the time of an optical sensor unit assembly, etc. are not needed, and an inspection process of prism after an assembly and a position of a sensor element can be skipped. Therefore, it becomes possible to produce an optical sensor unit cheaply quickly.

[0030]A function part to which the invention according to claim 9 prevents dirt on the surface of prism on an optical path of catoptric light from a sensor element to said shielding member in an optical sensor unit of claim 1 thru/or 2 given in any 1 paragraph is provided.

[0031]By providing a function part which prevents dirt on the surface of prism on an optical path of catoptric light from prism to a shielding member in this invention, It is possible to prevent to damage the prism surface between [while it becomes impossible to contact the prism surface directly and dealing with optical sensor units at the time of a device assembly and exchange, etc.] the transportation middle classes, or to soil.

[0032]In an optical sensor unit of claim 1 thru/or 10 given in any 1 paragraph, the invention according to claim 10 said shielding member, It comprises an upper face part which provided a channel for sending a measuring object to a sensor element, the face members 1 which were open for free passage, and a base part which installs prism and the face members 2 which were open for free passage.

[0033]By making a top face member which provided a channel for originally sending a measuring object to a sensor element in this invention, and a bottom member which installs prism composition which face members were made to open for free passage, respectively, Since a vertical and horizontal member of the 4th page can be constituted from two members, they are able for there to be few member mark, to end, to be able to reduce the number of assemblers of production expense of the member itself, or an optical sensor unit, and to produce an optical sensor unit cheaply.

[0034]Since there are few assembling member mark, it is possible to be able to decrease an assembly error generated at the time of an assembly, and to raise assembling precision.

[0035]While the invention according to claim 11 comprises prism for making catoptric light which a sensor element which detects a measuring object, and incident light generated from a light source were entered in a sensor element, and was reflected by this sensor element penetrate to a detector, It comes to arrange said sensor element and prism at the same member in which the optical sensor unit A and the light source B which are covered in a shielding member which shades light, and the detector C which receives catoptric light reflected from a sensor element have a positioning member.

[0036]By coming to arrange the optical sensor unit A, the light source B, and the detector C that receives catoptric light reflected from a sensor element at the same member that has a positioning member in this invention, It is possible to become final and conclusive correctly a position of the optical sensor unit A and the light source B important for measurement as a sensor apparatus, and the detector C.

[0037]The invention according to claim 12 is constituted removable [from a positioning member] in said optical sensor unit in the photo-sensor device according to claim 11.

[0038]In this invention, when dirt and a crack are attached to a case where the sensor element surface deteriorates by an optical sensor unit comprising a positioning member removable, or prism and it requires exchange of a sensor element or prism, exchanging easily is possible.

[0039]Since it can desorb as an optical sensor unit, there is no fear of a fluid which remained in the sensor element surface adhering to a hand, or soiling other members.

[0040]In a photo-sensor device of claim 11 thru/or 12 given in any 1 paragraph, the invention according to claim 13 said optical sensor unit, While comprising a positioning member removable, an attachment-and-detachment guide member is provided in a positioning member which contacts this optical sensor unit.

[0041]In this invention, an attachment-and-detachment guide member is provided in a positioning member which contacts an optical sensor unit -- a desorption guide member -- an optical sensor unit -- desorption -- since it is derived to an easy position, it is possible to ensure desorption easily.

[0042]The invention according to claim 14 has established structure which said optical sensor unit joins to a positioning member on the side in the photo-sensor device according

to claim 11.

[0043]When an optical sensor unit has provided structure joined to a positioning member in the side in this invention, A position of an optical sensor unit is become final and conclusive only in operation which joins a positioning member to the structured division joined when equipping a positioning member with an optical sensor unit, and immobilization of an optical sensor unit becomes certain.

[0044]The invention according to claim 15 has a channel which consists of a discharge part for discharging said same member from an inflow part and an optical sensor unit for making a measuring object flow into an optical sensor unit in a photo-sensor device of claim 11 thru/or 14 given in any 1 paragraph.

[0045]By having a channel which consists of a discharge part for discharging in this invention from an inflow part and an optical sensor unit for making a measuring object flow into an optical sensor unit, Piping of an optical sensor unit and a photo-sensor device can be connected, and it becomes possible to send a fluid to the sensor element surface in an optical sensor unit.

[0046]As for the invention according to claim 16, in the photo-sensor device according to claim 15, said channel is constituted removable to said optical sensor unit surface.

[0047]In this invention, by constituting said channel removable to said optical sensor unit surface, Connection of piping for sending a fluid on the sensor element surface from the optical sensor unit exterior and removal can be easily performed now, and clearing work can be easily performed at the time of exchange of an optical sensor unit.

[0048]As for said light source, in the invention according to claim 17, in the photo-sensor device according to claim 11, a lens and a photogen comprise one.

[0049]In this invention, since a member for fixing a lens to a fixed position, etc. are not needed while being able to fix physical relationship of a lens and a photogen uniformly, when a light source is constituted [a lens and a photogen] by one, reduction of the number of assemblers of a photo-sensor device and a miniaturization of a device are possible.

[0050]This invention is [the invention according to claim 18] characterized by that a biogenic substance sensing device comprises the following.

A fixed quantity of a measuring object in a test sample is a measurable sensor apparatus, and it is a photo-sensor device of claim 11 thru/or 17 given in any 1 paragraph.

A liquid-sending means to send a test sample to this photo-sensor device.

A solution storing section which washes said sensor element surface.

[0051]By having had a photo-sensor device, a liquid-sending means to send a test sample to this photo-sensor device, and a solution storing section that washes said optical sensor unit surface in this invention, It is only inserting a test sample to measure with a photo-sensor device in a biogenic substance sensing device, and measurement of a test sample is possible.

[0052]Since it has a solution storing section for washing the optical sensor unit surface,

after measuring subject data, it is possible to be able to wash the sensor element surface and to carry out duplicate measurement.

[0053] This invention is [the invention according to claim 19] characterized by that urine ingredient test equipment comprises the following.

A urine test means formed in a toilet bowl.

A transportation means which conveys urine from this urine test means to a sensor apparatus.

Claims 11 thru/or 18 which quantify a measuring object contained in urine sent from this transportation means are the photo-sensor means of a statement either.

A solution storage means for washing the sensor element surface of this photo-sensor device, and a displaying means which displays a numerical value quantified with this photo-sensor device.

[0054] It is only urinating for a urine test means formed in a toilet bowl, if it is in this invention, and it is able for a transportation means which conveys urine to a sensor apparatus to convey urine to a sensor apparatus, to measure a measuring object contained in urine, and to display a measurement result numerically.

[0055] Since it has a solution storage means for washing the sensor element surface, the sensor element surface after measurement can be washed and duplicate measurement is possible.

[0056] An invention of claim 20 is the sensor unit provided with a sensor element which detects a measuring object, and a channel to be formed in one on the surface of this sensor element, and for said measuring object flow.

[0057] According to the invention of claim 20, if a measuring object flows a channel, a measuring object will be detected by a sensor element. For this reason, it becomes possible by making a measuring object flow continuously to detect continuously. Since a channel is formed in one on the surface of a sensor element, it can save time and effort at the time of including a sensor unit in a device.

[0058] An invention of claim 21 is the sensor unit which established an entrance and an exit of said channel in a part higher than the surface of said sensor element.

[0059] Since an entrance and an exit of a channel were established in a part higher than the surface of a sensor element according to the invention of claim 21, a measuring object in which a flow stopped stagnates on the surface of a sensor element. Therefore, even if a flow of a measuring object stops, the surface of a sensor element is dipped with a solution having contained a measuring object, and is not dried.

[0060] An invention of claim 22 is provided with the following.

An acquisition means with which measures a user's excrement obtained by a stool act in a toilet, and is a health care apparatus which performs measurement / offer operation which provides information which participates in this user's health care based on this measurement, and a toilet bowl is equipped and which acquires said excrement.

A sensor element which detects a predetermined ingredient contained in excrement acquired by this acquisition means.

A measuring means which measures predetermined physical quantity of a channel to be formed in one on the surface of this sensor element, and for said excrement flow, a sensor unit ** constituted, and an ingredient detected by this sensor unit.

[0061]According to the invention of claim 22, if excrement flows a channel, a predetermined ingredient contained in excrement by sensor element will be detected. For this reason, it becomes possible by making excrement flow continuously to detect continuously a predetermined ingredient contained in excrement. Since a channel is formed in one on the surface of a sensor element, it can save time and effort at the time of including a sensor unit in a device.

[0062]And according to the health care apparatus of this invention, a result of measurement is obtained from excrement excreted in everyday life. That is, it cannot call at a specialized agency but can measure in everyday life. Therefore, a result of measurement can be acquired by sufficient frequency to catch change of health condition which advances very gently or is improved, and various prophylaxis, early detection, and therapies can be performed effectively. It can be aimed at excrement by stool acts, such as urine and facilities, as excrement. According to the purpose, it is good for sweat, saliva, an ovulation thing, menstrual blood, etc. Content of various ingredients contained in excrement besides being volume of the excrement itself, mass, density, etc. as predetermined physical quantity in connection with excrement, concentration, etc. are mentioned.

[0063]In an invention of claim 23, it had a cleaning means which washes a channel formed in said sensor unit.

[0064]According to the invention of claim 23, since a cleaning means washes a channel formed in a sensor unit, repeated measurement is attained.

[0065]In claim 24, said excrement is urine and said measurement is characterized by being a thing about at least one ingredient among urine sugar, protein, occult blood, sodium ion, and uric acid.

[0066]Measurement data illustrated here has the following meaning, respectively. Urine sugar is utilizable for diabetic prevention, discovery, a therapy, etc. Protein is also called albumin in urine and can be utilized effective in early detection of diabetic nephropathy. Since it is said that it does not recover unless diabetic nephropathy in particular treats by discovering at an early stage dramatically, detection of albumin in urine has high validity. It is known for an early stage of diabetic nephropathy that albumin will be excreted by minute amount in urine. Therefore, if a small amount of such albumin is used as measurement data and detection of it is enabled, it is utilizable for early detection of diabetic nephropathy. Naturally, it is effective also in discovery of a nephropathy of non-diabetic nature.

[0067]Occult blood is one of the signs of inflammation produced in the kidney, a ureter, an urethra, etc., a calculus, etc. In an early stage, that blood is mixing into urine cannot glance,

and it cannot check, but is in the state where it is called asymptomatic hematuria which does not have a subjective sign to the person himself/herself, either. In a health care apparatus of this invention, if occult blood is used as measurement data, since it is possible to detect occult blood in a stage of this asymptomatic hematuria, it is utilizable for early detection and a therapy of illness of the above-mentioned versatility.

[0068]Sodium is the measurement data used as a rule of thumb of intake of salinity of a day. It is known well that salinity will become factors, such as hypertension and cardiac insufficiency. For such prophylaxis and a therapy, it is preferred to control intake of salinity to a suitable value. However, intake of salinity does not necessarily meet the taste and a lot of salinity may be contained also in foodstuffs which are not felt so saltily in many cases. On the other hand, it is known that it is proportional to intake for sodium salt in urine mostly. Therefore, if sodium shall be detected as measurement data, intake of salinity can be grasped and it can utilize for the control.

[0069]Uric acid is known as causative agents, such as gout. Uric acid is said to excrete about a little less than 80% of a composite quantity of a day in urine. Therefore, if uric acid in urine is measured, a uric acid value in the living body can be presumed, and it can utilize for gout, other prophylaxis, and a therapy.

[0070]Various measurement data explained here is only illustration, in addition can make various measurement data into a measuring object of a health care apparatus of this invention. Naturally, two or more measurement data is not cared about as an object of measurement.

[0071]In claim 25, a statistical work using two or more measurement results memorized by said first memory measure is included in the first memory measure that memorizes a result of said measurement one by one, and said measurement / offer operation.

[0072]Although measurement data includes various errors resulting from a user's everyday life act, these errors are usually settled in predetermined dispersion within the limits. In claim 25, influence of with error can be reduced to a grade utilizable for health care by enabling memory of measurement data one by one, and performing a statistical work based on a result of memorized measurement. Therefore, according to claim 25, data utilizable for health care can be acquired, without increasing a parameter or performing a complicated compensation process to the measurement data itself. According to claim 25, in order to obtain significant measurement data, complicatedness which adjusts conditions at the time of acquiring excrement is avoidable, and also complicatedness of inputting an acquiring condition is avoidable. Of course, after enabling an input of an acquiring condition and taking this into consideration, it is also possible to perform a statistical work.

[0073]The following statistical works shall be performed. Generally, it is thought that an error of measurement data is settled in the range of predetermined dispersion as mentioned above. On the contrary, when measurement data which separates from predetermined dispersion is obtained, it can be surmised that it had a certain abnormalities in causes other than the usual error factor, i.e., a user's health condition. Therefore, while

extracting measurement data out of the range of predetermined dispersion which calculates standard deviation and average value and is specified based on standard deviation to average value, it is good also as what computes a value and occurrence frequency of extracted measurement data. If it carries out like this, based on such values and occurrence frequency, health condition is manageable.

[0074]The number of results which are needed in order to obtain a method of a statistical work and a suitable result can be variously set up according to the contents of measurement data. For example, like urine sugar, about large measurement data of a daily variation, measurement data with which an acquiring condition was similar shall be chosen from data acquired for two or more days, and it shall ask for variation per day statistically. About measurement data with comparatively few daily variations, a statistical work can also be performed based on all the obtained data. A statistical work can be performed by well-known various methods, such as average value and calculation of standard deviation, for example.

[0075]In claim 26, it has a data transfer means which can be exchanged for a result of said measurement among said two or more health care apparatus.

[0076]A place where an individual does a stool in everyday life is not necessarily one place. Usually a stool is carried out at various places, such as a house and a place where one has gone. Since an exchange of measurement data will be attained among two or more devices if a health care apparatus shall be equipped with an above-mentioned data transfer means, even if it is a case where a stool is carried out at a different place, these data is manageable unitary. As a result, individual analytical data can be acquired more frequently and more suitable health care can be performed.

[0077]As a data transfer means, various means are applicable. For example, data can also be considered as composition which can be delivered and received by communication of a cable or radio with health care apparatus. In this case, a mode which exchanges data via a network besides a mode which exchanges immediate data with health care apparatus is possible, and it is. It is good also as what adopts a method of recording individual measurement data on a portable recording medium of a flexible disk etc. as a data transfer means.

[0078]When it has a data transfer means, it is possible, then still more desirable in an exchange of devices other than a health care apparatus, for example, a general purpose computer etc., and data. If it carries out like this, more suitable health care can be performed based on measurement data.

[0079]By claim 27, it had an identification device which identifies two or more users, and the second memory measure that memorizes a result of said measurement in a mode which secured correlation with a this identified user.

[0080]Since a toilet bowl is equipped with a health care apparatus of this invention, in everyday life, its a possibility that two or more users will use one health care apparatus is high. By claim 27, in this case, correlation with a user can be secured, and said

measurement data can be memorized to it. Therefore, even if it is a case where two or more persons use it, it becomes possible to perform an individual's health care appropriately.

[0081] Various means are applicable to a user's identification device. For example, operation for a user to specify self shall be performed. It is good also as a method of choosing self from a list of users beforehand inputted into a health care apparatus, and when using it, it is good also as what inputs ID which specifies self. It is good for a final controlling element of a health care apparatus also as what gives a function which measures a fingerprint. When it is assumed like use at home that a user's sex difference, age difference, etc. are greatly separated, it is good also as what identifies a user based on information, including weight, electric capacity, etc.

[0082] In claim 27, it is good also as what is further different in measurement data according to a user. Since only measurement data which everybody need is acquirable if it carries out like this, capacity of a memory measure which memorizes expense and measurement data which measurement takes can be saved.

[0083] Although the health care apparatus of this invention can set up various measuring objects, it is preferred to carry out the object of the measurement data which can detect a long-term change of a user's health condition especially.

[0084] About illness which is covered at a long period of time and to which it will not necessarily go on rapidly in 1 thru/or about 2 days, and condition of disease reaches an advanced stage gently like a lifestyle-related disease, it is desirable to inspect frequently for the prevention and a therapy. It can inspect by sufficient frequency, without according to the health care apparatus of this invention, an individual sensing a big burden, since analytical data are appropriately acquirable in everyday life. Therefore, if aimed at measurement data which can detect a long-term change of a user's health condition, it is utilizable effective in prevention of a lifestyle-related disease etc., early detection, and a therapy. According to a sick kind and condition of disease, a period suitable for evaluating the advance is said for a long period of time. If it may be several days, it may continue at long periods of time, such as several weeks and several months.

[0085] A health care apparatus of this invention is considered as composition which has an adoption unit removable to a rim portion of a Western style toilet bowl by an embodiment of the invention as a thing about composition of a device. On the other hand, it is good also as a size which can carry a device. The whole device is made portable and also a device portable in various modes can be constituted. For example, it constitutes as carrying of only a unit which memorizes extraction conditions of a unit and urine of extracting and saving urine being possible, and the urinary analysis itself is good also as what is performed ex post by a main part of a health care apparatus to install. It is good also as what adopts a method simple as a sensor for measuring each ingredient in urine. It may constitute as a device which limited an ingredient used as an analysis object. If it carries out like this, measurement data can be acquired without choosing a toilet and it will become possible to

acquire measurement data utilizable for health care more frequently and continuously. Since a device can be prepared for every individual, a user's specification also has an advantage which becomes easy.

[0086]It is also possible to build a urine test unit into a toilet seat. If it carries out like this, it will become possible to be stabilized and to attach a urine test unit to a Western style toilet bowl. Naturally, it is possible by exchanging the toilet seat itself to attach a health care apparatus to a Western style toilet bowl already installed afterwards. In addition, it cannot be overemphasized that a health care apparatus may be built in a Western style toilet bowl or a cabinet. A toilet bowl furnished with a urine test unit is not restricted to a Western style toilet bowl, either.

[0087]In a sensor apparatus with which the invention according to claim 28 is provided with a biosensor element reacted to a specimen, and a detector which detects the reacting weight, While providing a sensor unit which has a channel between the ON side opening, the appearance side opening, and this ON side opening and the appearance side opening, and has arranged a biosensor element in this channel, An exit corresponding to an applied part by which a sensor unit is detached and attached, and the ON side opening and the appearance side opening, It constitutes so that a body side unit which has an entrance may be provided, a fluid supply way to a biosensor element may be formed by attaching the ON side opening and an exit and fluid exhaust passage from a biosensor element may be formed by attaching the appearance side opening and an entrance.

[0088]In this invention, by forming a sensor unit and a body side unit by a separate member, when a jam arises in a channel, a fluid supply way and fluid exhaust passage can be decomposed easily, and it becomes possible to fix easily.

[0089]A sensor unit becomes exchangeable [a sensor element] easily, without raising a liquid lappet also at the time of sensor element exchange, since a biosensor element is arranged in a channel between the ON side opening and the appearance side opening.

[0090]In the above invention, when an exit and an entrance attach an exit to the ON side opening, the invention according to claim 29 is constituted so that an entrance may be simultaneously attached to the appearance side opening.

[0091]In this invention, it becomes possible to equip a body side unit easily at the time of exchange of a sensor unit.

[0092]When the invention according to claim 30 attaches the ON side opening and an exit in the above invention, a seal of a fluid supply way is made and a seal of fluid exhaust passage is made by attaching the appearance side opening and an entrance.

[0093]Since it becomes possible [after clearing work of a sensor unit] in this invention to equip a body side unit with a sensor unit certainly, there are no worries about liquid leakage, such as a sample.

[0094]An invention of claim 31 and 32 statements is formed in an exit, an entrance is respectively formed at the tip of a convex member, these convex member is characterized by the ability to insert in the ON side opening and the appearance side opening, and two

convex members are characterized by being movable to mutual.

[0095]In this invention, since an exit and an entrance are formed at the tip of a convex member, the ON side opening and the appearance side opening can perform connection of a channel.

[0096]As for a channel, in the invention according to claim 33, in the above invention, content volume has a center portion of rectangular parallelepiped shape, and an upstream section with a larger flow area than this center portion and a downstream part, and, as for a biosensor element, that surface faces a center portion.

[0097]In this invention, since it is an upstream section with a larger flow area than a channel of a biosensor element surface, and a downstream part, liquid exchange in a biosensor element surface can carry out certainly.

[0098]While having the prism for the invention according to claim 34 entering in a biosensor element incident light generated from a light source in the above invention, and making catoptric light reflected with a biosensor element penetrate to a detector, A sensor unit possesses this prism, and in this invention characterized by things, prism is provided in a sensor unit, and since prism does not touch [things] a member of a direct sensor apparatus, dirt of prism, breakage, etc. can be prevented.

[0099]A biosensor element to which the invention according to claim 35 reacts to a specimen, In a sensor apparatus provided with prism for entering in a biosensor element a detector which detects the reacting weight, and incident light generated from a light source, and making catoptric light reflected with a biosensor element penetrate to a detector, A sensor unit by which a biosensor element and prism have been arranged where physical relationship is fixed, and a body side unit which has an applied part by which a sensor unit is detached and attached are provided, and it is characterized by the ability of a sensor unit to detach and attach freely to a body side unit.

[0100]In this invention, when a biosensor element in a sensor unit deteriorates by the ability of a sensor unit to detach and attach freely to a body side unit, exchange of a sensor unit can perform a biosensor element easily.

[0101]

[Embodiment of the Invention]Hereafter, a drawing explains an embodiment of the invention in detail. Drawing 1 is the sectional view seen from the side which shows the entire configuration of the optical sensor unit of the 1st example.

[0102]The above-mentioned optical sensor unit is provided with the following.

As shown in drawing 1, it is the sensor element 1.

Prism 2.

Optical-path adjusting member 3.

The sealant 4 which forms a channel and performs the seal between a sensor element and a sending portion, the upper face part which provided the channel for sending a measuring object to a sensor element and the face members 5 which were open for free passage, and the base part which installs prism and the face members 6 which were open for free

passage.

[0103]In order to measure as a sensor apparatus, a measuring object is sent on the sensor element 1, Adjust the light from the light source 10 to the sent position by the optical-path adjusting member 3, it is made to enter in the prism 2, the light reflected from the sensor element 1 is received with the detector 11, and detection and operation of quantifying if needed are required.

[0104]Then, unless it is being fixed to the position with exact degree of incidence angle and irradiation position of the position of the sensor element 1 and the prism 2, and the light adjusted by the optical-path adjusting member 3, right measurement cannot be carried out.

[0105]In the optical sensor unit shown in drawing 1, a position becomes final and conclusive the prism 2 by pushing against the base level 20 on the right-hand side of [figure] a base part and the face members 6 which were open for free passage. And the sensor element 1 is put on the prism 2 from a top, and it presses down and attaches from a top in the state by an upper face part and the face members 5 which were open for free passage. Then, the face members 5 are equipped with the alignment member 7, the role which pushes the prism 2 against the base level of the face members 6 at the time of an assembly is played, and the position of the sensor element 1 and the prism 2 can be fixed correctly.

[0106]The prism 2 provides a gage pin (not shown) in prism 2 the very thing, when what was produced by light transmittance state resin is used, Establish the crevice (not shown) doubled with it in the face members 6, and position the prism 2, or, Since the shape of the prism 2 has flexibility, it can be easier and the position of the prism 2 can be fixed correctly, such as it being reverse, establishing a crevice (not shown) in the prism 2, and providing the heights (not shown) doubled with it in the face members 6.

[0107]Since the crevice is produced by the face members 6 about the optical-path adjusting member 3 according to the degree of incidence angle of light and the bore diameter of the crevice and the outer diameter of the optical-path adjusting member 6 are produced by the size which can be pressed fit, the degree of incidence angle of light is fixable only by arranging the optical-path adjusting member 3 to the crevice of the face members 6.

[0108]About the irradiation position of light, since the position of a crevice, prism, etc. is being fixed so that it may become an irradiation position of a suitable light, the irradiation position of light is correctly fixable by pressing the optical-path adjusting member 3 in the crevice of the face members 6, and fixing.

[0109]Since [which became independent of the light source 1 or said optical sensor unit as shown in drawing 1] a member, the optical-path regulation member 3 can exchange only the optical-path adjusting member 3, using said condenser for the optical-path regulation member 3 according to a use, or using the gobo which has said pinhole.

[0110]With a use here, since the case where the gobo which has a pinhole miniaturizes a photo-sensor device when small LED with a small output and cheap LED of a light source

are used for a condenser, for example, and the lens are expensive, the case where the cost cut of a photo-sensor device is aimed at etc. are raised.

[0111]The antibody is being fixed, and the surface of the sensor element 1 needs to fill the sensor element 1 surface with conservation liquid, in order to maintain at the state where the antibody can be measured at any time. The sensor element 1 is provided with the sealant 4 which forms a channel and performs the seal between the sensor element 1 and a sending portion, forces it on the sensor element 1 from the upper part by the upper face part which provided the channel for sending a measuring object for the sealant 4 to the sensor element 1, and the face members 5 which were open for free passage, and forms the channel 8 in the sensor element 1 surface. The antibody of the sensor element 1 surface can be saved by pouring and storing conservation liquid in the channel 8 in the state. In this optical sensor unit, after pouring conservation liquid on the sensor element 1 surface, a lid (not shown) is formed in the channel established in the face members 5, a plug is carried out so that air bubbles may not enter the sensor element 1 surface, and it changes into the state where liquid seal of the inside of the passage part 8 was always carried out so that conservation liquid may not flow into the channel 8 exterior.

[0112]As mentioned above, although the face members 5 and the face members 6 have played the role of preservation of the sensor element 1 surface, the role of protection of one more and the prism 2 is also played. The entrance plane, reflector, and emission face of the prism 2 must be a mirror plane, and when a crack and dirt adhere to those fields, they affect a measurement result greatly. then -- constructing the prism 2 by the face members 5 and the face members 6 -- ***** -- the prism 2 is protected from the contact from the outside, the breakage at the time of a shock, etc. by things.

[0113]Since the sensor element 1 and the prism 2 can be protected and kept by incorporating the sensor element 1 and the prism 2 in the shielding member of said optical sensor unit, Since neither the sensor element 1 nor the prism 2 is damaged or soiled and the sensor element 1 surface is in the always measurable state when having carried and conveyed the optical sensor unit, conveyance, transportation, and exchange of an optical sensor unit can carry out conveniently very quickly.

[0114]Drawing 2 thru/or 5 are the figures showing the entire configuration of the photo-sensor device of the 1st example.

[0115]The above-mentioned photo-sensor device is provided with the following.

As shown in drawing 2 thru/or 5, it is the optical sensor unit 9.

Light source 10.

Detector 11.

The same member 15 that arranges the optical sensor unit 9 attachment-and-detachment guide member 12, the passage part 13 for making a measuring object flow into the optical sensor unit 9, the positioning member 14 for the optical sensor units 9, and the light source 10, the detector 11 and the positioning member 14 for the optical sensor units 9.

[0116]In this optical sensor apparatus, the physical relationship of the optical sensor unit 9, the light source 10, and the detector 11 affects the measurement result of a sensor apparatus. Then, it positions by fixing to the same member 15 directly about the light source 10 and the detector 11. About the optical sensor unit 9, in order to have formed the sensor element 1 and to make it exchangeable, it is necessary to have removable composition. Therefore, since it is directly unfixable to the same member 15, in order to be certainly able to fix the optical sensor unit 9 to a fixed position, the positioning member 14 for the optical sensor unit 9 is fixed to the same member 15.

[0117]The positioning member 14 consists of a plinth of the three sizes. By pressing the optical sensor unit 9 side on the three upper surface of this plinth, the X axial direction of the optical sensor unit 9 can be positioned.

[0118]As shown in drawing 5, the pin by which the tip is thin stands on two of three plinths of the positioning member 14. As the partner, as shown in drawing 1, the optical sensor unit 9 is equipped with the structure 16 joined to the positioning member 14. The tip of the positioning member 14 is thin in order that it may perform junction in the structure 16 to join smoothly. Junction in the structure 16 joined to the positioning member 14 can be smoothly performed by providing the portion which the entrance of the structure 16 to join also carried out camfering etc., and made the path large. By joining the structure 16 joined to the positioning member 14, positioning of Y shaft orientations of the optical sensor unit 9 and Z shaft orientations can be performed.

[0119]The same member 15 is equipped with the attachment-and-detachment guide member 12 which helps attachment and detachment of the optical sensor unit 9. The spring (not shown) is used for the attachment-and-detachment guide member 12, and power is always applied in the direction which escapes from the same member 15 in the optical sensor unit 9.

[0120]As shown in drawing 4, when the attachment-and-detachment guide member 12 is equipped with the optical sensor unit 9 and it pushes in in the same member 15 direction to a certain portion by human power etc., it is locked and the attachment-and-detachment guide member 12 is fixed on that spot. The optical sensor unit 9 with which the attachment-and-detachment guide member 12 was equipped, While the attachment-and-detachment guide member 12 is locked, the pin by which the tip of the positioning member 14 fixed to the same member 15 as the structure 16 in the optical sensor unit 9 to join became thin is joined first. Then, when the attachment-and-detachment guide member 12 is locked, the optical sensor unit 9 is forced on three plinths of the positioning member 14, and the position of the optical sensor unit 9 is become final and conclusive.

[0121]As shown in drawing 3, after the optical sensor unit 9 is fixed to the same member 15, the passage part 13 which consists of a discharge part for making it discharge with the inflow part for making a measuring object flow from the optical sensor unit 9 upper part descends, and it is piped with the channel established in optical sensor unit 9 upper face part. The passage part 13 is arranged on the same member 15, and only its Z shaft

orientations are movable. It has structure which the spring (not shown) as well as said attachment-and-detachment guide member 12 is used, has required power in the direction in which the passage part 13 always escapes from the optical sensor unit 9, and requires a lock in a certain portion pushed in in the optical sensor unit 9 direction by human power etc.

[0122]In order for fluids, such as a measuring object, to flow into the piping part of the optical sensor unit 9 and the passage part 13, it is necessary to devise so that there may be no liquid leakage. So, in this optical sensor apparatus, an O ring is used for the nozzle 17 of the passage part 13, Crushing an O ring, as it is inserted in the passage part of the optical sensor unit 9, prevent liquid leakage, or, When the sealant 4 which has elasticity, such as silicone rubber, in the optical sensor unit 9 is included in the channel of optical sensor unit 9 upper face part, the passage part 13 descends and it is inserted in the channel of optical sensor unit 9 upper face part, The structure of having crushed sealant 4 upper face part and preventing liquid leakage by the nozzle 17 of the passage part 13 was taken.

[0123]In order to remove the optical sensor unit 9 which is a member [exhausting], As shown in drawing 2, the optical sensor unit 9 is arranged in the attachment-and-detachment guide member 12, From the photo-sensor device in the state where forced the attachment-and-detachment guide member 12 in the same member 15 direction, and locked it, and moved the passage part 13 in the optical sensor unit 9 direction from the upper part, connected piping, and the passage part 13 was locked, as shown in drawing 3, The lock of the passage part 13 is canceled first, the passage part 13 is moved upwards, and piping is cut.

[0124]Next, as shown in drawing 4, the lock of the attachment-and-detachment guide member 12 is canceled, and the optical sensor unit 9 is pulled apart from the same member 15.

[0125]Then, if take out the optical sensor unit 9 from the attachment-and-detachment guide member 12, instead the new optical sensor unit 9 is incorporated, the lid formed in the unit upper surface is removed and operation contrary to the above is performed as shown in drawing 5, exchange of the optical sensor unit 9 will be ended.

[0126]In this optical sensor apparatus, it has the lock release button 19. Once it pushes the lock release button 19, the lock of the passage part 13 is canceled first, the passage part 13 moves up, then the lock of the attachment-and-detachment guide member 12 is canceled, and the optical sensor unit 9 is pulled apart from the same member 15.

[0127]The unit with which the collimate lens which processes the scattered light into a parallel beam at LED was unitized was used for the light source 10.

[0128]By carrying out unitization of the collimate lens to LED, a place is not taken but it becomes possible to produce the compact light source 10.

[0129]It becomes possible to weaken light intensity of LED compared with using the scattered light by using the collimate lens which processes the scattered light into a parallel beam. Since the parallel beam [light / which enters in the optical sensor unit 9] at this time,

since it is almost equivalent, the entering light intensity can compensate easily gap of the position of the optical sensor unit 9 and the light source 10 with every portion compared with using the scattered light.

[0130]Drawing 6 is a figure showing the entire configuration of the biogenic substance sensing device of the 1st example.

[0131]The above-mentioned biogenic substance sensing device is provided with the following.

As shown in drawing 6, it is the photo-sensor device 21.

Liquid-sending means 22.

Solution storing section 23.

The control board 24, the result display board 25, and the heat buffer 26.

[0132]In order to measure a measuring object using the above-mentioned biogenic substance sensing device, a measuring object is poured in to the liquid-sending means 22 using an automatic sample injector etc. The poured-in measuring object is sent by the liquid-sending means 22 to the photo-sensor device 21. The liquid-sending means 22 is controlling the speed and volume which send the liquid by the control board 24. The measuring object sent by the liquid-sending means 22 is measured by the photo-sensor device 21. The measurement result is processed and evaluated by the control board 24. The evaluated measurement result is transmitted to the result display board 25 from the control board 24, and a result is displayed as a numerical value with a result display board.

[0133]The buffer solution for diluting the solution which contains a measuring object in the solution storing section 23, or washing the sensor element 1 surface, A measuring object and the regenerant which makes combination of a prehension substance dissociate are stored on the calibration solution [of the known concentration having contained the measuring object for computing as a value a fixed quantity of measured value detected by the sensor], and sensor element 1 surface.

[0134]The liquid-sending means 22 has a role which sends buffer solution and the calibration solution which are stored in the solution storing section 23 with the role which sends the solution having contained the measuring object to the photo-sensor device 21, and regenerant to the photo-sensor device 21. The valve (not shown) is provided in the liquid-sending means 22, and the solution which sends the liquid by the change of the valve is changed. The change of a valve is controlled by the control board 24.

[0135]In order for this optical sensor apparatus to perform more exact measurement, it is necessary to maintain at constant temperature the solution having contained the measuring object sent by the sensor element 1 surface. In this biogenic substance sensing device, it measured by installing the whole sensing device in the space which can keep the temperature of a thermostat etc. constant. In order to produce a device that it is small and easily, the heat buffer 26 is equipped in living body line segment test equipment, the inside of the heat buffer 26 was passed for the solution which sends the liquid, and after adjusting

temperature uniformly, means to send the liquid to a photo-sensor device were also taken.

[0136]It is a figure showing the urine test means which provided *drawing 7* in the entire configuration of the urine ingredient test equipment of the 1st example, and *drawing 8* formed in urine ingredient test equipment.

[0137]The above-mentioned urine ingredient test equipment is provided with the piping 29 which opens for free passage the urine test means 27 attached to a toilet bowl, the biogenic substance sensing device 28 for inspecting a urine ingredient, and a urine test means and a biogenic substance sensing device as shown in *drawing 7*.

[0138]The swinging arm 272 supported by said base material rockable considering level axis of rotation which extended the urine test means 27 to the base material 271 attached to a toilet body, and the transverse direction of the toilet bowl, and was estranged from the upper surface of the rim flank to the upper part as a center, Have the driving means 274 which makes said swinging arm rock in order to move said urine test container between the urine test container 273 supported by the free end of said swinging arm, and the position of rest which approaches inside a toilet bowl rim and the urine test position located in toilet bowl space, and by this composition. The urine discharged by the user of test equipment is extracted.

[0139]The urine extracted by the urine test means 27 is sent by said liquid-sending means 22 in the biogenic substance sensing device 29. The urine extracted while the liquid was sent by the liquid-sending means 22 to the photo-sensor device 21 is diluted to measurable concentration with the buffer solution in the solution storing section 23. The urine which was diluted and was sent in the photo-sensor device 21 is measured, and is discharged in a toilet bowl after that. Eluate, a calibration solution, and buffer solution are sent on the sensor element 1 surface after measurement, and the sensor element 1 is reproduced in the measurable state.

[0140]*Drawing 9* is the sectional view seen from the side which shows the sensor unit for sensor apparatus and the entire configuration of a connecting member of the 2nd example.

[0141]The above-mentioned sensor unit and a connecting member are provided with the following.

It is the channel 101 as shown in *drawing 9*.

Channel 102.

Sensor element 103.

The prism 104, the lower member 105 for prism immobilization, the upper member 106 for prism immobilization provided with the channel 101, the member 107 for channel immobilization provided with the channel 102, the sealing member 108 for the sensor element surfaces, and the sealing member 109 for connecting parts with the channel 101 with which the channel 102 was equipped.

[0142]The sensor element 103 is arranged on the prism 104, by the upper member 106 for prism immobilization, and the lower member 105 for prism immobilization, from the upper

and lower sides, gives a pressure and is fixed. It reacts to a specimen on the sensor element 103 surface then at the sensor element 103 top, The rubber packing 108 is arranged as a sealing member for the sensor element surfaces of the ring shape which the sliding direction opened wide in order to form the channel 101 for holding, The sealing member 108 is crushed by the upper member 106 for prism immobilization, and the lower member 105 for prism immobilization, and the ceiling is carried out so that there may be no liquid leakage.

[0143]As mentioned above, the sensor element 103, the prism 104, and the upper member 106 for prism immobilization, The unit (henceforth a sensor unit) formed by the lower member 105 for prism immobilization and the sealing member 108 for the sensor element surfaces connects piping with the main part of a sensor apparatus in the opening of the upper part established in the channel 101.

[0144]In the pars basilaris ossis occipitalis of the channel 101 which is concave shape, the sealing member 108 for the sensor element surfaces forms a side attachment wall, It is connected with the channel made on the sensor element 103 surface, and solutions sent from the solution entrance (upside opening) of the channel 101, such as a specimen and a penetrant remover, pass through a sensor element 103 surface top, react to the sensor element surface, and are discharged from the solution outlet of the channel 101.

[0145]It is necessary to send the liquid into a sensor unit and so that there may be no liquid leakage, and it is necessary to discharge the solution sent from the main part of a sensor apparatus to the sensor unit out of a sensor unit at this time.

[0146]Therefore, the member 107 for channel immobilization provided with the channel 102 was used, and the O ring has been arranged in the channel 102 as the sealing member 109 for connecting parts for preventing the liquid leakage from a connecting part with the channel 101. Since it was crushed on the channel 101 and channel 102 side when the O ring which is this sealing member 109 for connecting parts connects the channel 102 which is heights, and the channel 101 which is crevices, the liquid leakage from a connecting part was able to be prevented.

[0147]In the member 107 for channel immobilization, in order to form the channel 102, the nozzle 121 from which the inside serves as a cave is formed, and the inside of a nozzle forms the channel 102. And between the space 172 for including this nozzle 121 and the nozzle of the member for channel immobilization, it has a gap, and is provided in it rotatable in the longitudinal direction.

[0148]Drawing 10 illustrates the state where the channel 101 and the channel 102 connected.

[0149]As mentioned above, when the sealing member 109 for connection is used for the channel 102, the dead space 109A (drawing 11) arises in a connecting part with the channel 101. If a dead space arises, a solution will remain into the portion. A measurement result may be affected when a solution remains to a dead space. Then, equipped the sealing member for connecting parts in the channel 101, it is made to crush in the tip part of

the channel 102, and the liquid leakage from a connecting part was prevented so that a dead space might be pressed down to the minimum.

[0150]Drawing 12 is the sectional view seen from the side in which the entire configuration of the connecting member is indicated to be the sensor unit for sensor apparatus which equipped the sealing member 10 for connecting parts in the channel 101.

[0151]An O ring can be used as the sealing member 10 for connection arranged in the channel 101. In the case of the sensor cell shown in this drawing 12, press the channel 102 fit, and it does not crush and carry out the seal of the sealing member with a wall on either side. Since it crushes up and down and a seal is carried out at the channel 101 bottom and the channel 102 tip, compared with the type which a pressure did not take at the time of attachment and detachment of the channel 101 and the channel 102, but has arranged the sealing member to said channel 102, detaching and attaching smoothly is possible.

[0152]Drawing 14 is a sectional view of the sensor unit for sensor apparatus made into the connecting part tapered shape structure 111 of the channel 101 and the channel 102.

[0153]When the connecting part of the channel 101 and the channel 102 is made into the tapered shape structure 111, it is necessary to make it pushing force certainly applied to the channel 101 and the channel 102 like drawing 14, for carrying out the seal of the connecting part. Then, the elastic members 113, such as a spring and silicone rubber, are arranged in the nozzle member 112 upper part including the channel 102.

[0154]When the channel 101 and the channel 102 were connected, the channel holddown member 7 having included the channel 102 is moved, and it was made to make it connect with the sensor cell side. It set up connect the sensor cell at that time, and the member 107 for channel immobilization in the distance which requires pushing force for the elastic member 113. By doing so, pushing force comes to take at the time of connection of the channel 101 and the channel 102. Therefore, if the connecting part of the channel 101 and the channel 102 is made into the tapered shape structure 111, it will become possible to prevent the liquid leakage from a connecting part.

[0155]Although the above indicated only the case where the connecting part of the channel 101 and the channel 102 was made into the tapered shape structure 111, The sensor apparatus which was mentioned above and which has arranged the sealing member 109 for connection to the channel 102, It is possible to raise the sealing nature of a connecting part by flowing the nozzle member 111 also into the sensor apparatus which has arranged the sealing member 110 for connecting parts with an inflow member, dividing into a member, and arranging or using the elastic member 113 in the channel 101.

[0156]In order to deal with a sensor element and prism as an exchangeable optical sensor unit in this invention, It becomes possible to perform easily exchange at the time of adhering to exchange and the prism of a sensor element in a crack or dirt, and further, preservation of a sensor element and protection of prism can be performed and conveyance, transportation, and exchange of an optical sensor unit become possible [carrying out conveniently very quickly].

[0157]Many mechanisms, such as a member which helps removable piping and attachment and detachment of an optical sensor unit, are contained, and the sensor apparatus can perform measurement which uses a removable optical sensor unit correctly and easily.

[0158]the channel 1 and specimen which were formed on the sensor element surface in this invention -- supply -- and -- or by the channel 2 for discharging comprising a separate member, when a jam arises in a channel, it becomes possible to decompose and fix easily.

[0159]It becomes exchangeable [a sensor element] easily, without raising a liquid lappet also at the time of sensor element exchange, since the channel 1 for holding a specimen is formed on the sensor element surface.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1]While comprising prism for making catoptric light which a sensor element which detects a measuring object, and incident light generated from a light source were entered in a sensor element, and was reflected by this sensor element penetrate to a detector, An optical sensor unit, wherein said sensor element and prism are covered in a shielding member which passes only light on an optical path of incident light and catoptric light.

[Claim 2]The optical sensor unit according to claim 1 having a channel which becomes exchangeable [said sensor element / a fluid which contained a measuring object on the surface].

[Claim 3]An optical sensor unit of claim 1 thru/or 2 providing an optical-path adjusting member which adjusts an optical path of light from a light source in said optical sensor unit given in any 1 paragraph.

[Claim 4]The optical sensor unit according to claim 3, wherein said optical-path adjusting member is a condenser.

[Claim 5]The optical sensor unit according to claim 3, wherein said optical-path adjusting member is a gobo which has a pinhole.

[Claim 6]An optical sensor unit of claim 3 thru/or 5, wherein a crevice is formed at an angle of incident light for exciting SPR to a sensor element and said optical-path adjusting member is arranged in this crevice while it is arranged between a light source and a sensor element given in any 1 paragraph.

[Claim 7]An optical sensor unit of claim 1 thru/or 2, wherein said prism is light transmittance state resin given in any 1 paragraph.

[Claim 8]An optical sensor unit of claim 1 thru/or 2, wherein an alignment member for sealing and carrying out the plane of composition of prism and the sensor element to said shielding member is provided given in any 1 paragraph.

[Claim 9]An optical sensor unit of claim 1 thru/or 2 given in any 1 paragraph which carries out that a function part which prevents dirt on the surface of prism is provided on an optical path of catoptric light from prism to said shielding member with the feature.

[Claim 10]An upper face part which provided a channel for said shielding member to send a measuring object to a sensor element, and the face members 1 which were open for free passage, An optical sensor unit of claim 1 thru/or 9 comprising a base part which installs prism, the face members 2 which were open for free passage, and the face members 3 for shading lights other than incident light and catoptric light given in any 1 paragraph.

[Claim 11]A photo-sensor device using an optical sensor unit characterized by coming to be arranged at the same member characterized by comprising the following.

A sensor element which detects a measuring object.

While comprising prism for making catoptric light which incident light generated from a light source was entered in a sensor element, and was reflected by this sensor element penetrate to a detector, it is said sensor element.

The optical sensor unit A covered in a shielding member in which prism shades light.

The light source B and the detector C which receives catoptric light reflected from a sensor element are positioning members.

[Claim 12]The photo-sensor device according to claim 11, wherein said optical sensor unit comprises a positioning member removable.

[Claim 13]A photo-sensor device of claim 11 thru/or 12 given in any 1 paragraph while said optical sensor unit comprises a positioning member removable, wherein an attachment-and-detachment guide member is provided in a positioning member which contacts this optical sensor unit.

[Claim 14]The photo-sensor device according to claim 11, wherein said optical sensor unit has provided structure joined to a positioning member in the side.

[Claim 15]A photo-sensor device of claim 11 thru/or 14, wherein said same member has a channel which consists of a discharge part for discharging from an inflow part and an optical sensor unit for making a measuring object flow into an optical sensor unit given in any 1 paragraph.

[Claim 16]The photo-sensor device according to claim 15, wherein said channel is constituted removable to said optical sensor unit surface.

[Claim 17]The photo-sensor device according to claim 11 with which said light source is characterized by a lens and a photogen comprising one.

[Claim 18]A sensor apparatus measurable in a fixed quantity of a measuring object in a test sample characterized by comprising the following.

A photo-sensor device of claim 11 thru/or 17 given in any 1 paragraph.

A liquid-sending means to send a test sample to this photo-sensor device.

A solution storing section which washes said sensor element surface.

[Claim 19]Urine ingredient test equipment comprising:

A urine test means attached to a toilet bowl.

A transportation means which conveys urine from a urine test means to a sensor

apparatus.

Claims 11 thru/or 18 which quantify a measuring object contained in urine sent from this transportation means are the photo-sensor means of a statement either.

A solution storage means for washing a photo-sensor element surface of this photo-sensor device, and a displaying means which displays a result detected with this photo-sensor device.

[Claim 20]A sensor unit comprising:

A sensor element which detects a measuring object.

A channel to be formed in one on the surface of this sensor element, and for said measuring object flow.

[Claim 21]A sensor unit establishing an entrance and an exit of said channel in a part higher than the surface of said sensor element in the sensor unit according to claim 21.

[Claim 22]A health care apparatus which performs measurement / offer operation which provides information which measures a user's excrement obtained by a stool act in a toilet, and participates in this user's health care based on this measurement, comprising:

An acquisition means with which a toilet bowl is equipped and which acquires said excrement.

A sensor element which detects a predetermined ingredient contained in excrement acquired by this acquisition means.

A channel to be formed in one on the surface of this sensor element, and for said excrement flow.

A measuring means which measures predetermined physical quantity of a sensor unit ** constituted and an ingredient detected by this sensor unit.

[Claim 23]A health care apparatus which is the health care apparatus according to claim 22, and is characterized by having a cleaning means which washes a channel formed in said sensor unit.

[Claim 24]A health care apparatus, wherein it is a health care apparatus given in claims 22 thru/or 23, said excrement is urine and said measurement is a thing about at least one ingredient among urine sugar, protein, occult blood, sodium ion, and uric acid.

[Claim 25]The first memory measure that is a health care apparatus given in claims 22 thru/or 24, and memorizes a result of said measurement one by one, and a health care apparatus, wherein a statistical work using two or more measurement results memorized by said first memory measure is included in said measurement / offer operation.

[Claim 26]A health care apparatus which is a health care apparatus of a statement and equips claims 22 thru/or 25 with a data transfer means which can be exchanged for a result of said measurement among said two or more health care apparatus.

[Claim 27]A health care apparatus given in claims 22 thru/or 26 characterized by

comprising the following.

An identification device which identifies two or more users.

The second memory measure that memorizes a result of said measurement in a mode which secured correlation with an identified this user.

[Claim 28]While providing a sensor unit characterized by comprising the following which has a channel between the ON side opening, the appearance side opening, and this ON side opening and the appearance side opening, and has arranged said biosensor element in this channel in a sensor apparatus, An exit corresponding to an applied part by which said sensor unit is detached and attached, and said ON side opening and the appearance side opening, A sensor apparatus constituted so that a body side unit which has an entrance may be provided, a fluid supply way to said biosensor element may be formed by attaching said ON side opening and said exit and fluid exhaust passage from said biosensor element may be formed by attaching said appearance side opening and said entrance.

A biosensor element reacted to a specimen.

A detector which detects the reacting weight.

[Claim 29]The sensor apparatus according to claim 28 constituted so that said entrance may be simultaneously attached to said appearance side opening when said exit and an entrance attach said exit to said ON side opening.

[Claim 30]The sensor apparatus according to claim 28 or 29, wherein a seal of said fluid supply way is made and a seal of said fluid exhaust passage is made by attaching said appearance side opening and said entrance by attaching said ON side opening and said exit.

[Claim 31]Any of claims 28-30 which said exit and an entrance are respectively formed at the tip of a convex member, and can insert these convex member in said ON side opening and the appearance side opening, or a sensor apparatus of a statement.

[Claim 32]The sensor apparatus according to claim 31 with said two convex members movable to mutual.

[Claim 33]Any of claims 28-32 for which content volume has a center portion of rectangular parallelepiped shape, and an upstream section with a larger flow area than this center portion and a downstream part in said channel, and said biosensor element is characterized by that surface facing said center portion, or a sensor apparatus of a statement.

[Claim 34]Any of claims 28-33 in which said sensor unit possesses this prism while having the prism for entering in said biosensor element incident light generated from a light source, and making catoptric light reflected with said biosensor element penetrate to said detector, or a sensor apparatus of a statement.

[Claim 35]A sensor unit by which said biosensor element and said prism have been

arranged in a sensor apparatus where physical relationship is fixed, comprising, A body side unit which has an applied part by which said sensor unit is detached and attached is provided, and said sensor unit is a sensor apparatus which can be detached and attached freely to said body side unit.

A biosensor element reacted to a specimen.

Prism for entering in said biosensor element a detector which detects the reacting weight, and incident light generated from a light source, and making catoptric light reflected with said biosensor element penetrate to said detector.

[Translation done.]